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STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

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March 19, 1992

*Leach-assigned
C. Arnold*

Allan Harris
200 Aggregate Area Unit Manager
U.S. Department of Energy
P.O. Box 550
Richland, Washington 99352

Re: Ecology Review of the U Plant Source Aggregate Area
Management Study Report

Dear Mr. Harris:

Enclosed for your consideration is the Washington State Department of Ecology review of the *U Plant Source Aggregate Area Management Study Report*, DOE/RL 91-52, Draft A.

Since this is a secondary document, as defined in the Hanford Federal Facility Agreement and Consent Order, a less formal comment presentation has been adopted. We have attempted to write deficiencies, comments, observations and recommendations within a single paragraph or two. Thus, our recommendations for needed changes to this report are found within the comments. Please let us know how well this format works.

In general, Ecology is pleased with this first aggregate area study report. An impressive amount of information has been compiled and is well-organized. The authors of this report are to be commended. The tables and figures in particular are excellent, and very useful.

Ecology looks forward to discussing these comments with USDOE-RL and its contractors. Should you have questions prior to our March 24 meeting, please call me at (206) 438-7018.

Sincerely,

Larry Goldstein
CERCLA Unit Supervisor
Nuclear and Mixed Waste Management

cc: Paul Day, EPA
T.B. Veneziano, WHC



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U PLANT SOURCE AGGREGATE AREA MANAGEMENT STUDY REPORT

GENERAL COMMENTS

There is no indication of whether limited field characterization activities were conducted to meet the objective to "conduct limited new site characterization work if data or interpretation uncertainty could be reduced by the work" (Section 1.3, page 1-8). For example, some of the unplanned releases (Table 5-1) are evaluated as low priority sites on the basis of hazard ranking scores (HRS). Limited field characterization data taken at these unplanned release locations might have helped to better support decisions for expedited, interim, or limited actions.

The criteria and rationale for the recommendations made in Section 9.0 need to be further developed. A more logical progression of data, analysis of data (including limitations and data needs) and final recommendations would provide better support for the recommendations.

No schedules are provided for submittal of the work plans for the prioritized operable units. Also, there is no commitment nor schedules for conducting treatability studies for the recommended remedial technologies.

The report appropriately references the draft Hanford Site Baseline Risk Assessment Methodology (DOE 1991) in several areas. However, the AAMS should follow accepted risk-based screening procedures, which are based on EPA Region 10 guidance (EPA 1991), when attempting to reduce the number of contaminants.

The report focuses primarily on human exposure and resulting health effects. The AAMS must include additional information on ecological exposure and potential effects as specified in EPA (1989b,c).

There is little information provided in this report describing the interaction among various RL programs. The integration of RCRA, CERCLA and D&D activities is critical to ensure timely and cost-effective program management.

The report often is written in the future tense, and leaves unanswered many specific questions concerning how, when and by whom decisions will be made.

SPECIFIC COMMENTS

1. Section 1.2.2, page 1-6, second paragraph

The text indicates Topical Reports will be based on information in WIDS. A great deal of WIDS information has already been summarized in the 200-UP-2 Operable Unit Work Plan, and this AAMS. New reports generated subsequent to this AAMS should be focused on satisfying specific data quality objectives, and should augment WIDS data. For example, compiling new data for operational histories and waste disposal records (see Sections 2.4 and 8.1.2).

2. Section 1.4, page 1-9

The text on quality assurance should also reference standard EPA guidance documents, e.g. *Contract Laboratory Program Statement of Work for Organic Analysis* (EPA 1988), and the *Quality Assurance Project Plan* being written for 100 Area work plans.

3. Section 1.5, page 1-11

The reference to Appendix D: "Data Management Plan" is misleading. This section of text is more appropriately titled, "Information Management Overview". This is consistent with how this information is being described in the 100 Area work plans.

4. Section 2.3.1, page 2-4

The text references the decommissioning and decontamination program without any explanation of what this program is, or when remediation will occur. Similarly, the text in Section 2.3.1.2.1, page 2-7, accurately refers to remediation of the 222-U laboratory under a "separate decommissioning and decontamination program", with no explanation.

Coordination among various RL programs is critical to ensure integrated, mutually supportive and cost-effective remediation site-wide. An explanation of how the D&D program relates to remedial action under the Hanford Federal Facility Agreement and Consent Order, and how activities will be coordinated, would help clarify this issue.

5. Section 2.3.1.1.2, page 2-7

There are no data provided to support the assertion in this paragraph that only "Currently, noncorrosive steam condensate ... goes through the 207-U basins and the 216-U-14 Ditch." Unless data are provided, this paragraph should be modified, and the report should describe when this data will be collected.

6. Section 2.3.2, page 2-8, second paragraph

The text should describe how the single-shell tank closure program is occurring under the auspices of RCRA, as provided for in the Hanford Federal Facility Agreement and Consent Order.

7. Section 2.3.2.1, page 2-9, second paragraph

This paragraph should reference Table 2-5 for unplanned release data. Also, there is a discrepancy of 1,000 gallons between the text and Table 2-5, for the amount of bismuth phosphate leaked from the tank.

8. Section 2.3.2.12, page 2-17, third paragraph

The text states that the total volume believed to have leaked as 8,500 gallons, whereas Table 2-5 only notes the initial 500 gallon leak in 1969. Table 2-5 should be corrected. Also, the reference for unplanned releases should be corrected to read "Section 2.3.10". This correction also applies to the second paragraph on page 2-20.

9. Section 2.3.3.5, page 2-25

This text on the 216-U-17 crib should be updated to include M-17 activities. Describe the resumption of flow to the crib that began 1/20/92, and is scheduled to cease 6/95; also describe the anticipated effluent quality and sampling requirements, e.g. *UO₃ Plant Process Condensate Effluent to 216-U-17 Sampling and Analysis Plan* (WHC-SD-CP-PLN-11).

10. Section 2.3.3.7, page 2-25

This text on the 216-Z-20 crib should be updated to describe M-17-16A activities.

Given the information presented in this section, and the clear inclusion of this crib in the U Plant Aggregate Area, the rationale for not including the crib in planned investigations and remediation within this aggregate area should be explained.

11. Section 2.3.3.7, page 2-26, first paragraph

The source(s) of data describing releases, leaks and spills should be included in this paragraph.

12. Section 2.3.5.1, page 2-29

The text describes the 216-U-10 Pond as being approximately 30 acres in size at its maximum, but gives no indication of what the status of the pond is today, e.g. is there any water left in the pond? What were the levels of surface radiation in 1990 that required two-feet of fill soil to be placed south of the pond? What are the data sources for "deactivation" activities?

13. Section 2.3.9.2, page 2-43, second paragraph

Is the *200-UP-2 Operable Unit Technical Report* (DeFord 1991) a Topical Report prepared for this study? This appears to be a key reference document.

14. Section 2.3.10, page 2-43, second paragraph

This paragraph raises a couple of interesting points. The statement concerning the need to compile more information is welcome, and noteworthy, since this "next step" data need is infrequently mentioned in Section 2.3.

The text would be clarified by reference to Section 9.2.4.5. For example, the text states "a formal evaluation of the regulatory status of these (two) sites will be made." What does this mean? Are these the same sites already indicated for remediation under the RARA program in Section 9.2.4.5?

15. Section 2.6, page 2-48, second paragraph

The text states the 216-U-12 crib is a TSD facility because of discharge of corrosive process condensate. The text should explain why this criterion isn't met for other cribs, e.g. the 216-U-16 crib was active post-November 1980 and likely received similar wastes. It appears that the 216-Z-19 ditch, active until September 1982, also should be classified as a RCRA past practice unit.

The text also references closure of the 216-U-12 crib under RCRA. However, no information is provided to explain this "interaction". How will closure/post closure of this crib be coordinated with the investigation and remediation of other cribs in the aggregate area or operable units?

16. Section 2.7, page 2-49

The text in this section is informative in mentioning other Hanford Programs, but says very little about how these programs "interact" to ensure integrated, mutually supportive and cost-effective compliance and remedial activities occur on a site-wide basis.

17. Figures and Tables, pages 2F-1a to 2T-9b

The figures and tables presented in this section are excellent, and should serve as a model for operable unit work plans and subsequent aggregate area reports.

18. Table 2-2, page 2T-2

The 216-U-12 trench should be referenced by the same designation number as used in Section 2.3.5.1.6, i.e. 216-U-11. It also appears that the 216-Z-19 ditch is missing from this table.

19. Section 3.2.1, page 3-3

The description of precipitation should include information concerning seasonal storm events. This would lead into a more detailed discussion in Sections 3.5.1 and 3.5.2.2 concerning the potential impact of stormwater runoff on recharge and the spread of contamination.

20. Section 3.4.3.3, page 3-16

The statement that the Plio-Pleistocene unit "is continuous in the U Plant Aggregate Area" appears misleading, and contradicts preceding text in this section which mentions the "good possibility" of erosional windows. Also, Section 2.3.3.1 describes gaps and transport through the caliche layer (of uranium) into the unconfined aquifer.

21. Section 3.5.1, page 3-19, fourth paragraph

Did the research by Gee (1987) and Routson and Johnson (1990) include sampling during early spring storm events? Temperatures in February-March, for example, would seem to preclude much evapotranspiration.

22. Section 3.6, pgs. 3-32 to 3-36

There is a great deal of information presented in this section. Unfortunately, there are no references provided to simplify additional data collection.

For example, it would be helpful for planning field work to know the location of sensitive or threatened flora. Reference is also made to badgers (Section 3.6.3.1) and harvester ants (Section 3.6.1.3.4), and data indicating these fauna can spread contamination. A key data objective for this and subsequent studies is to quantify environmental pathways; this report should consistently support satisfying this objective.

23. Section 3.6.3, page 3-38

The text notes there are no "domestic" ground water supply wells within the aggregate area. Are there any public ground water supply wells? The text should explain where on-site workers derive their potable water.

The text also notes the nearest domestic well is over 20 miles distant from the study area. Wells 699-24-94 and 66-52-C are located approximately 5 miles WSW of the 200 West Area. The text should be modified.

24. Section 4.1.1.2.1, page 4-4

This section would be improved with a better attempt to make sense of what the data do indicate, with limitations, rather than explaining what they don't tell us. It is not clear, for example, why it is "nearly impossible" to convert gross gamma counts to a meaningful exposure rate due to "the complex distribution of radionuclides on the site."

Within the context of surface soil radiological surveys, it may be true, as stated, that not all data will accurately describe surface conditions. But what is the point in making this distinction? Where, for example, are data on the "shallow buried radionuclides?"

25. Section 4.1.1.2.2, page 4-6, first paragraph

The text notes very high readings for the 216-U-Pond in 1985, with much lower readings in subsequent years. Data and citations would improve the value of this section. Section 4.1.1.2.1. also refers to the lower counts associated with Pond, but without providing any data. However, there was sufficient radioactivity just south of the Pond in 1990 to require a two-foot fill of clean soil (see Section 2.3.5.1).

These concerns address not only the completeness of topics in this report, but more importantly, the data that needs to be presented. In this case, data and justification must be provided given the determination in Section 9.2.3.2 that insufficient data exists to conduct an IRM for the Pond.

26. Section 4.1.1.4, page 4-7, first paragraph

It is stated that no upward trends in radionuclide concentrations were detected in wildlife species. In order for this information to be useful, baseline data must be presented, e.g. trends from what standard? Specific references should be provided to enable further research and field investigations.

Are there statistically significant data to support the statement, "there are no statistically significant trends in vegetation radionuclide concentration since 1979?" If so, please provide some data and a citation. If not, the text should be modified.

27. Section 4.1.1.5, page 4-8, third paragraph

The conclusion that only eight waste management units have the potential for contaminating the unconfined aquifer requires qualification. For example, it appears from Table 4-13 the 216-U-14, 216-Z-11 and 216-Z-19 ditches were not included in the calculations. Is this because there are no data on waste volume received in these units? Are there any empirical data to support the calculations? Also, it should be described how these determinations were used in making recommendations regarding LFIs and IRMs for these units.

28. Section 4.1.2.3.1, page 4-13, fourth paragraph

The text refers to an "accident" that apparently flushed thousands of pounds of uranium into the aquifer. This unplanned release should be explained. It could be inferred from the data that this flushing action was the result of systematic discharge from the 221 and 224-U Plants. When did this accident occur? Are there calculations on how much uranium is left in the vadose zone?

29. Section 4.1.2.3.7, page 4-14, third paragraph

The data presented indicating no radionuclide contamination of ground water is not conclusive. Does the liner regression, based on an average migration of 0.3-feet per year, assume homogeneity of the entire vadose zone? Where is the screened interval in this well? Are there more recent data to compare results?

In general, when determinations or assumptions concerning the fate and transport of contaminants are based on historical data, there should be a reference to the 200 West Aggregate Area study, and a requirement that recent monitoring well data be used to test these assumptions.

30. Section 4.1.2.5.1, pgs. 4-17 to 4-18

The radionuclide data in this one section is presented in multiple units indicating activity and mass volume, e.g. ct/min, Pci/L, mrem/yr and ppm. Throughout this report, it would be helpful if conversions could be made where possible in order to simplify and make uniform data presentation.

31. Section 4.1.2.5.4, page 4-22, sixth paragraph

The text notes that plutonium and americium were the most important radionuclides released to the 216-Z-ID ditch. How is "important" used in this context? A source for the data gathered in 1980 should be provided.

32. Section 4.2, page 4-27, first paragraph

The purpose of this section is to assess known data and develop a conceptual model on potential impacts to human health and the environment. This discussion presents only human exposure concerns. The text should also discuss potential ecological concerns and environmental pathways.

33. Section 4.2, page 4-27, third paragraph

Standard EPA risk assessment guidance documents, e.g. *Risk Assessment Guidance for Superfund*, should also be referenced in this paragraph.

34. Section 4.2.2, page 4-29, first paragraph

Ingestion of soil (from fugitive dust or during characterization), direct contact with nonradionuclides, and uptake from contaminated biota through the foodchain should also be presented in this summary of transport pathways.

35. Section 4.2.2.2, page 4-33, third paragraph

The conclusion that, "the contribution from the U-Plant Aggregate Area to site-wide fugitive dust emissions is expected to be relatively minor" seems unsubstantiated and lacking purpose. It also appears contrary to the very high levels of surface radiation described in Section 4.1.1.2.1, and Figure 4-1, and fugitive dust control in the 216-U-14 Ditch. Please elaborate.

36. Section 4.2.2.4, page 4-34

The acknowledgement in this section of major data gaps regarding biotic transport and environmental pathways should be clearly identified in Section 5.0 and addressed in Section 8.3.3.6. Where in this report are requirements to quantify environmental pathways?

There are no data or references included in this discussion. A major purpose of this report is to define data needs and facilitate additional data compilation and field work.

37. Section 4.2.4, page 4-36, first paragraph

The rationale or reference for using the second criterion is not presented, and contaminants appear to be inappropriately eliminated by the use of one of the screening criteria (third bullet). These criteria are discussed below.

The second criterion indicates that buildup of short-lived daughter radionuclide activity to a level of 1 percent or greater of the parent radionuclide activity causes the daughter to be included on the

contaminant-of-concern list. However, the rationale or reference for this criterion is not included, and should be. If the parent activity is extremely high, 1 percent may not be a conservative screening level.

The third criterion indicates that contaminants were placed on the contaminant-of-concern list if they are known or suspected carcinogens or have an EPA noncarcinogenic toxicity factor. It appears that contaminants not meeting such criteria are eliminated from the contaminant list. This screening fails to follow the contaminant screening process outlined in the DOE (1991) methodology. This criterion should be deleted.

Missing from this list are references to regulatory standards, e.g. § 300.430(2), RCW 70.105, and 173-340 WAC. The risk assessment methodology for the Hanford site should be discussed and referenced in this section.

38. Section 4.2.4.3.1, page 4-39, fifth paragraph

The text in this section and Table 4-28 should account for speciation of contaminants. For example, there is a major difference in the mobility and toxicity of arsenic depending on its valence state and ligands.

39. Section 4.2.4.5.1, page 4-41, first paragraph

The text states that genetic and teratogenic effects generally occur at higher exposure levels than those required to induce cancer. The reference supporting this statement should be included.

40. Section 4.2.4.5.1, page 4-42, second paragraph

This paragraph discusses the excess cancer risks for exposure to radionuclide contaminants via various exposure pathways. The text should also discuss the use of slope factors in the determination of cancer risks and provide a reference for the slope factors.

41. Section 4.2.4.5.1, page 4-42, third paragraph

EPA guidance, e.g. *Risk Assessment Guidance for Superfund*, should also be referenced in this paragraph.

42. Section 4.2.4.5.1, page 4-42, last paragraph

The text states that EPA risk assessment guidance assumes exposure to multiple carcinogens resulting in effects that are additive without regard to target organ or cancer mechanism. The text should distinguish between radionuclide and nonradionuclide additivity. That is, risks from multiple radionuclides can be added together, and risks from nonradionuclides can be added together.

However, risks from radionuclides and nonradionuclides should not be added together because of differing assumptions in the respective exposure assessment equations.

A reference to 173-340-708(5)(6) WAC, for example, would enhance the regulatory context needed in making risk assessment determinations.

43. Section 4.2.4.5.2, page 4-43, second paragraph

It is stated that many chemicals lacking toxicity criteria have "negligible toxicity or are necessary nutrients in the human diet." There is no citation provided for this assertion, and it is of questionable validity.

Many trace metals are necessary in the human diet, and most are highly toxic, some acutely so, in sufficient levels. What is the point of this statement?

44. Section 4.2.4.5.1, page 4-42, third paragraph

The text references the *Hanford Baseline Risk Assessment Methodology*, which proposes to use the dose conversion factors developed by the International Commission on Radiological Protection to calculate risk values when EPA slope factors are not available. However, this document also states that if a slope factor is not available, the EPA Office of Radiation Programs will be consulted and requested to develop the required slope factor. This requirement should be mentioned in the text.

45. Figure 4-3, page 4F-3

The arrow leading from biota to humans (ingestion) should be deleted, unless the authors know something we don't!

46. Table 4-32, page 4T-32a

This table appears to provide only human health effects information; the title of the table should reflect this. The table indicates the Integrated Risk Information System and the Registry of Toxic Effects of Chemical System (RTECS) were used for locating toxicity information. RTECS is not commonly used in a toxicity assessment. EPA (1989a), Chapter 7, Section 7.4, provides a list of resources that should be used for locating toxicological information. RTECS can be used, but only after resources included in EPA 1989a have been exhausted. In addition, a column should be included that provides the reference for each piece of data.

47. Section 5.0, page 5-1

The title of this section is "Health and Environmental Concerns", yet the entire section is devoted to describing human health only. Where is the discussion on environmental concerns?

48. Section 5.1, page 5-2, first paragraph

The title of this section, Conceptual Framework for Risk-based Screening, is misleading. The reader expects to find information on risk assessment screening procedures as outlined in EPA (1989a,1991) guidance. What is presented is a discussion on general exposure pathways and an occupational exposure scenario. Therefore, a more appropriate title for this section is "Conceptual Framework for the Occupational Scenario."

49. Section 5.1, page 5-2, fourth paragraph

The text should indicate that the occupational exposure scenario is most appropriate for identifying current health hazards associated with the U Plant Aggregate Area. Health hazards could change dramatically during investigation and remedial activities.

50. Section 5.2.1, page 5-4, first paragraph

It appears from the data presented that the 216-U-1 and 216-U-2 cribs, and the 216-U-10 pond should be added to this list of high priority sites. Please clarify.

51. Section 5.3, page 5-7, third paragraph

The acronym "ENS" should be defined.

52. Table 5-1, page 5T-1a

The table or accompanying text should define the column entitled Environmental Protection Score.

The uranium contamination leak and paint waste spill sites do not have HRS or mHRS ratings. However, these sites were given a priority of "No." The rationale should be given in the text for giving these sites a priority of "No" when data are not available.

53. Section 6.4.2.3, page 6-18, third paragraph

Washington state regulatory requirements are correctly noted in the first paragraph of this section. Therefore, the statement that "Ecology may require use of AKART", is misleading; this requirement isn't optional.

54. Section 6.6, page 6-19, second paragraph

Regulatory citations, for example 173-340-720(6) WAC, would be helpful in this discussion of Point of Compliance.

55. Section 7.1 and 7.2, pgs. 7-2 to 7-4

These sections would be improved if they were written based on the fundamental concepts in CERCLA § 121(b). This regulation requires the preference for isolation and/or permanent and significant reduction in volume, toxicity and mobility of hazardous substances. Missing from the text in the third paragraph on page 7-3 is the goal of isolation and permanence in the remedial action.

For example, the text on page 7-4 implies that institutional controls will likely be a primary remedial measure, to the exclusion of treatment and isolation. As defined in § 300.430(a)(iii)(D), "the use of institutional controls shall not substitute for active response measures."

56. Section 7.1, page 7-3, third paragraph

The text discusses the media of concern for the U Plant Aggregate Area. The text should also discuss direct exposure to soils contaminated with nonradionuclides, and inhalation of particulates.

57. Section 7.4, pgs. 7-7 to 7-13

The text in this section appears to lack a commitment to performing treatability tests in order to support recommended remedial technologies. This is a major deficiency that should be corrected.

58. Section 8.2.1, page 8-13

There is reference in this section to ecological risk, but without a commitment to gather biologic data. "Site characterization" generally refers to geologic, hydrologic and contaminant specific data. This section should address biotic data uses. A specific reference to M-29-03 would also help.

59. Section 8.2.1, page 8-13, second paragraph

The text references only Superfund risk assessment guidance produced by EPA headquarters for human health risk assessment. EPA Region 10 risk assessment guidance (EPA 1991) for human health should also be referenced, as should EPA guidance on ecological risk assessment (EPA 1989b,1989c).

60. Section 8.2.2.2, page 8-16

This section should also incorporate the concepts and requirements defined in the *Quality Assurance Project Plan*. This generic document will be used in 100 Area investigations, and should be used in the 200 Area.

61. Section 8.2.2.3, page 8-17, fourth paragraph

The text notes that in the absence of data, an approach or rationale "will need to be developed to justify sampling locations and the number of samples selected." The text should describe when, how and by whom this will occur.

62. Section 8.2.2.5, page 8-18, second paragraph

This paragraph raises interesting points that we look forward to discussing in greater detail.

The statement that analysis of arsenic to much lower levels is "impossible because of limitations of analytical methods" should be explained. Most CLP procedures e.g., Method 200.62-C-CLP, can analyze to 500 ppb. However, we agree that background levels may make this point moot.

63. Section 8.3.3.3, page 8-25

Reference should be made to the UO₃ Plant stabilization activity defined in the M-17-19, and the sampling requirements contained therein.

64. Section 8.3.3.6, page 8-26, first paragraph

The ecological investigation discussion should include a statement that the information obtained through ecological investigation activities will be used to refine the conceptual model and in the ecological risk assessment.

65. Section 9.0, page 9-2, third paragraph

The text states that all recommendations for future characterization needs will be fully developed in the RFI/CMS. This statement is contrary to the *Hanford Past Practice Strategy*, which emphasizes LFIs in order to provide data necessary to make IRM decisions. Section 8.3.3 correctly lists field

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investigations being undertaken primarily as LFIIs and IRMs, and "possibly some RIs."

66. Section 9.1, page 9-2, fourth paragraph

The relationship between Imminent and Substantial Endangerment (ISE) and Expedited Response Actions (ERA) should be discussed within a regulatory context. An ISE has a specific regulatory meaning, whereas ERAs at the Hanford Site have occurred without determining an ISE situation exists.

67. Section 9.1, page 9-3, first paragraph

The text in this paragraph implies a degree of certainty for making recommendations that is inconsistent with numerous paragraphs describing data limitations. See for example, the last paragraph in Section 8.1.4.

This designation process should be expressed in very preliminary terms. What data, for example, were used to eliminate waste management units? The HRS ranking system data are extremely limited, and address essentially radioactivity only. The MHRS system is not approved by EPA or Ecology.

68. Section 9.1.1, page 9-4

This section should be examined to check for consistency with the *Hanford Past Practice Strategy* - "Programmatic Decisions", and EPA (1991b). Expedited Response Actions are undertaken to protect public health and the environment. These criteria are lost in this discussion.

69. Section 9.1.1, page 9-4, second paragraph

The rationale for using 100 times the CERCLA reportable quantity or 100 times the most applicable standard for a particular constituent when determining whether a site warrants an expedited response action (ERA) should be provided. It should be noted that this criterion is applicable under 173-340 WAC for soils only.

70. Section 9.1.1, page 9-5, first through third paragraphs

The first paragraph describes criteria that are vague, confusing, and appear inconsistent with § 300.415 criteria. Availability of resources, for example, is not a criterion for justifying an ERA, and should be deleted.

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71. Section 9.1.2, page 9-6, first paragraph

We agree that grouping of sites can be an effective way to reduce characterization requirements. The risk inherent in this approach is the assumption that similar units have received the same quantity and quality of wastes, and that all units have the same potential for causing adverse environmental effects. The data do not support this concept of homogeneity.

The text in Section 9.2.3.1, page 9-12 brings other criteria into consideration, and expresses a justified conservative approach. Consider moving this paragraph into this section, or modify this section to address this qualification.

72. Section 9.1.2, page 9-6, fourth paragraph

Availability of resources is not a criterion for justifying an IRM, and should be deleted.

73. Section 9.1.3, page 9-7, third paragraph

What regulatory authority allows a "no further action" recommendation for sites believed to be remediated, but the "location of the contamination is no longer known?" Who determines when a site is officially "lost."

74. Section 9.2.1, page 9-7

The text notes the 2607-W5 Septic Tank "was" recommended for an ERA. Where in the text is this recommendation made? For example, previous text in Sections 2.3.6.1 and 4.1.2.6 give no indication this tank and drain field present any notable human or environmental health problem. The information needed to justify this recommendation is finally provided in Section 9.2.1.1.

In general, a re-ordering of text, with an emphasis on providing important information as early as possible in the report, e.g. Sections 2.3 and 4.1, would provide a more logical progression of data, analysis and recommendations.

75. Section 9.2.2, page 9-10, fourth paragraph

The text notes there are 24 IRM candidate sites with inadequate data to meet an IRM designation. Twenty will remain as IRM candidates. What is the status of the other four sites?

76. Section 9.2.3.2, page 9-13, first paragraph

The linkage between this section and data presented in Section 2.3.5.1 seems to be missing. Some sites identified in earlier sections appeared to have sufficient data to recommend an IRM, e.g. 216-Z-19 ditch, but were not. There should be a summary of information and rationale in this section, and Section 9.2.3.1, to enable the reader to understand how and why these recommendations have been made.

77. Section 9.3.2, page 9-18

The rationale for removing investigation of groundwater and the 200 West Area groundwater operable unit from the scope is not provided, and should be.

Similarly, no reason is provided for including the 216-U-14 ditch and 207-U retention basin in the 200-UP-1 operable unit rather than the 200-UP-2 operable unit. The agencies need to resolve the classification of these units and identify how and when they will be remediated prior to the final draft of this report. Please see, Ecology letter dated March 14, 1992, regarding classification of the 216-U-14 Ditch.

A list of high-level waste transfer facilities and pipelines to be removed from the work scope of the 200-UP-1 and 200-UP-2 operable units is not provided, and should be.

As mentioned in Comment #10, no explanation is provided for including the 216-Z-20 crib in the Z plant AAMS. Similarly, why is there a recommendation to place the 216-S-4 french drain and the 216-S-21 in the S plant AAMS for the 200-UP-1 operable unit?

78. Figure 9-1, page 9F-1

This data evaluation flow chart should have explanatory text, best located in Section 9.2. It should be noted this chart is not intended to be comprehensive, for example, it does not include administrative requirements such as the Proposed Plan and public involvement prior to undertaking an IRM.

79. Table 9-1, page 9T-1a

The candidate ERA sites recommended for evaluation and implementation under the Radiation Area Remedial Action program should be listed in this table under a separate column. Also, the table should include the corresponding operable unit for each waste site.

80. Section 10.0, page 10-4

References should be included for EPA (1989b, 1991).

REFERENCES

- DOE 1991. Hanford Site Baseline Risk Assessment Methodology. DOE/RL-91-45. Decisional Draft. September 1991. U.S. Department of Energy.
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